SECTION 33 05 28

TRENCHING AND BACKFILLING FOR UTILITIES

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Bedding and backfilling materials.

B. Staking and grades.

C. Existing utilities.

D. Trenching and excavating.

E. Bedding and backfilling.

F. Field quality control.

1.02 RELATED SECTIONS

A. Dewatering is specified in Section 31 23 19, Dewatering.

B. Excavation support systems are specified in Section 31 50 00, Excavation Support and Protection.

C. Earthwork is specified in Section 31 00 00, Earthwork. The work of this Section shall conform with the requirements of Section 31 00 00, Earthwork, as applicable.

D. Foundation drains and other subsurface drainage are specified in Section 33 46 00, Subdrainage.

E. Electrical Lightning Details – Standard Drawing ES77

1.03 MEASUREMENT AND PAYMENT

A. Measurement: Trenching and backfilling for utilities will not be measured separately for payment.

B. Payment: Trenching and backfilling for utilities will be paid for as part of the indicated Contract unit prices for the associated piping, conduits, ductbanks, and utility structures.

1.04 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM C33/C33M Standard Specification for Concrete Aggregates

B. State of California, Department of Transportation (Caltrans), Standard Specifications, Section 96, Geosynthetics

C. State of California, Department of Transportation (Caltrans), Office of Structure Construction, “Trenching and Shoring” Manual

D. State of California, Department of Transportation (Caltrans), Office of Encroachment Permit, “Encroachment Permit”

1.05 DESCRIPTION

A. This Section includes specifications for excavating, trenching, and backfilling for utilities and related structures, as indicated in the Contract Documents, including underground piping for water supply, sanitary and storm sewerage piping; trackway and roadway site subsurface and drainage piping; underground electrical conduits and ductbanks; and utility boxes, catch basins, manholes, inlets, pull boxes, and vaults.

1. Trenching and backfilling for utilities includes restoration of existing pavements, where applicable, to the conditions existing before the excavation. Conform with applicable requirements of Section 32 12 16, Asphalt Paving, Section 32 13 13, Concrete Paving, and Section 32 16 21, Concrete Curbs, Gutters, and Walks.

1.06 REGULATORY REQUIREMENTS

A. Regulatory requirements that govern the work of this Section include the following governing codes:

1. California Code of Regulations (CCR), Title 8, Division 1, Chapter 4, Subchapter 4 — Construction Safety Orders, for trench excavations of 5 feet or more in depth.

2. California Code of Regulations, Title 24, Part 2, California Building Code, Chapter 33, Safeguards During Construction, for protection of the public.

1.07 SUBMITTALS

A. Refer to Section 01 33 00, Submittal Procedures, and Section 01 33 23, Shop Drawings, Product Data, and Samples, for submittal requirements and procedures. Submittals for trenches of 5 feet or more in depth shall be submitted to the Engineer for review and approval.

B. Submit drawings and supporting calculations for trench excavations and support systems of 5 feet or more in depth in accordance with the submittals requirements of Section 31 50 00, Excavation Support and Protection. All such submittals shall be prepared, sealed, and signed by a professional civil or structural engineer currently registered in the State of California.

PART 2 – PRODUCTS

2.01 BEDDING AND BACKFILLING MATERIALS

A. Bedding:

1. Sand: Sand for bedding of pipe in utility trenches shall be a clean and graded, washed sand, all passing a No. 4 U.S. Standard sieve, and conforming generally to ASTM C33 for fine aggregate. A finer sand may be used, if convenient, provided the sand is clean and does not contain deleterious substances in excess of the amounts specified in ASTM C33/C33M, Table 3.

    a. Only sand will be permitted for bedding of electrical conduit.

2. Class 2 Aggregate Base for bedding of pipe in trenches shall conform to the requirements in Section 32 11 23, Aggregate Base Course.

3. For electrical conduits refer to BART Standard Drawing ES77, Electrical Lighting Details.

B. Backfill Material:

1. Backfill for excavations and trenches under structures shall be Structural Fill as indicated. (Refer to Section 31 00 00, Earthwork, for requirements.)

2. Backfill for excavations and trenches under pavement shall be either Class 2 AB or Controlled Density Fill:

    a. Class A Aggregate Base shall conform to the applicable requirements of Section 32 11 23, Aggregate Base Course.

    b. Controlled Density Fill shall consist of a fluid, workable mixture of portland cement, clean and graded aggregate, and water. Refer to Section 31 23 25, Controlled Density Fill, for requirements.

3. Common Fill will be permitted only for backfilling of excavations and trenches in open areas and landscaped areas.

4. For electrical conduits refer to BART Standard Drawing ES77, Electrical Lighting Details.

C. Filter Fabric: Geotextile engineering fabric conforming to Caltrans Standard Specifications, Section 96, Geosynthetics.

PART 3 – EXECUTION

3.01 STAKING AND GRADES:

Refer to Section 31 00 00, Earthwork, for requirements.

3.02 EXISTING UTILITIES:

Refer to Section 33 05 25, Support and Protection of Utilities, and Section 31 00 00, Earthwork, for requirements.

3.03 TRENCHING AND EXCAVATING

A. Comply with the California Building Code, Chapter 33, as applicable.

B. Perform trenching and excavation as indicated and required for drainage and utility piping, conduits, and related structures, and provide shoring, bracing, pumping, and planking as required and as specified in Section 31 50 00, Excavation Support and Protection.

C. Excavate to the lines and grades indicated.

D. Excavate trenches for pipes and conduits by the open-cut method, except where tunneling or jacking are indicated. Hand-excavate for crossing pipelines.

E. In paved areas, saw cut pavement in straight lines. Saw cut pavement 1 ft outside the trench line to the depth of the pavement structural section. After compacting the backfill, restore pavement to a condition equivalent to that existing at the start of construction. Restore pavement damaged outside the straight lines.

1. Where indicated or required by the governmental authority having jurisdiction, provide slurry cement backfill for trench excavation to underside of pavement.

F. When distance between trench and lip of gutter or edge of pavement is 4 ft or less, the Asphalt Concrete pavement section shall be replaced and over layed up to the lip of gutter.

G. Excavate trenches to the indicated width at all points below a horizontal plane 2 feet above the top of the pipe. Excavation above this plane may exceed the indicated width as required. Where the width is not indicated, make the width not less than 6 inches nor more than 18 inches from the outside of the pipe. If the excavation exceeds permissible dimensions, install higher strength pipe or encase the pipe in Class 3000 concrete.

H. The bottoms of excavations shall be firm, undisturbed earth or cut sub grade, clean and free from loose material, debris, and foreign matter. When bottoms of excavations or trenches are a soft or unstable material, the bed shall be made firm and solid by removing said unstable material to a sufficient depth and replacing same with sand, compacted to at least 90 percent relative compaction.

I. Where water is encountered in the trench, dewater as specified in Section 31 23 19, Dewatering, and provide sand or pea gravel as required to drain the water and stabilize the bed.

J. Bell holes shall be accurately placed and shall not be larger than required to make the joint.

K. When backfilling operations of an excavation under pavement cannot be properly completed within a work day, steel plate bridging with a non-skid surface and shoring may be required to preserve unobstructed traffic flow.

1. Trench Plates shall comply with the Caltrans Encroachment Permit Manual Section 602.1 Temporary Steel Plate Bridging—With a Non-Skid Surface.

   - Trench Plates shall be installed by Method 1.

   - The duration and days(s) shall be approved by the Engineer.

L. Excavations for structures shall conform to applicable requirements of Section 31 00 00, Earthwork.

3.04 BEDDING AND BACKFILLING

A. Material for bedding of pipe shall be the material herein specified in Article 2.01 as applicable. Minimum thickness of sand bedding under concrete pipe shall be 2 inches. Provide firm and uniform support of piping at indicated elevations and grades. Tamp sand bedding as required for firm support.

1. The joints of gravity flow piping shall be wrapped with filter fabric all around the pipe. Place filter fabric under the pipe before laying pipe in sand bedding. Filter fabric shall extend at least 12 inches on each side of the joint.

B. Backfill below the horizontal centerline of pipe to 12 inches above the top of pipe shall be the material herein specified in Articles 2.01B, as applicable.

C. Backfill shall be placed in 6-inch layers, leveled, rammed, and tamped in place. Each layer shall be compacted with suitable compaction equipment to at least 90 percent relative compaction, taking care not to damage or misalign any pipe. The top 12 inches under structures and pavement shall be compacted to at least 95 percent relative compaction.

D. Backfilling around concrete structures and for ductbanks and similar utilities shall conform to the applicable requirements of Section 31 00 00, Earthwork.

3.05 FIELD QUALITY CONTROL

Comply with applicable requirements specified in Section 31 00 00, Earthwork.

END OF SECTION 33 05 28